

- [130] B. G. Ryder, “Constructing the Call Graph of a Program,” *IEEE Transactions on Software Engineering*, no. 3, pp. 216–226, 1979.
- [131] S. Narayan, C. Disselkoen, D. Moghimi, S. Cauligi, E. Johnson, Z. Gang, A. Vahldiek-Oberwagner, R. Sahita, H. Shacham, D. M. Tullsen, and D. Stefan, “Swivel: Hardening WebAssembly against Spectre,” in *30th USENIX Security Symposium, USENIX Security 2021, August 11-13, 2021*, pp. 1433–1450, 2021.
- [132] E. Johnson, D. Thien, Y. Alhessi, S. Narayan, F. Brown, S. Lerner, T. McMullen, S. Savage, and D. Stefan, “SFI Safety for Native-compiled Wasm,” *NDSS. Internet Society*, 2021.
- [133] M. Willsey, C. Nandi, Y. R. Wang, O. Flatt, Z. Tatlock, and P. Panchekha, “Egg: Fast and Extensible Equality Saturation,” *Proc. ACM Program. Lang.*, vol. 5, no. POPL, pp. 1–29, 2021.
- [134] “Stop a wasm compiler bug before it becomes a problem | fastly.” <https://www.fastly.com/blog/defense-in-depth-stopping-a-wasm-compiler-bug-before-it-became-a-problem>, 2021.
- [135] D. Cao, R. Kunkel, C. Nandi, M. Willsey, Z. Tatlock, and N. Polikarpova, “babble: Learning Better Abstractions with E-Graphs and Anti-unification,” *Proc. ACM Program. Lang.*, vol. 7, no. POPL, pp. 396–424, 2023.
- [136] R. Tate, M. Stepp, Z. Tatlock, and S. Lerner, “Equality Saturation: A New Approach to Optimization,” in *Proceedings of the 36th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, POPL*, pp. 264–276, 2009.
- [137] T. D. Morgan and J. W. Morgan, “Web Timing Attacks Made Practical,” *Black Hat*, 2015.
- [138] T. Schnitzler, K. Kohls, E. Bitsikas, and C. Pöpper, “Hope of Delivery: Extracting User Locations From Mobile Instant Messengers,” in *30th Annual Network and Distributed System Security Symposium, NDSS 2023, San Diego, California, USA, February 27 - March 3, 2023*, The Internet Society, 2023.
- [139] Mozilla, “Protections Against Fingerprinting and Cryptocurrency Mining Available in Firefox Nightly and Beta ,” 2019.
- [140] F. Cohen, “Computer Viruses: Theory and Experiments,” *Comput. Secur.*, vol. 6, no. 1, pp. 22–35, 1987.
- [141] P. Kocher, D. Genkin, D. Gruss, W. Haas, M. Hamburg, M. Lipp, S. Mangard, T. Prescher, M. Schwarz, and Y. Yarom, “Spectre Attacks: Exploiting Speculative Execution,” *meltdownattack.com*, 2018.

- [142] M. Schwarz, C. Maurice, D. Gruss, and S. Mangard, “Fantastic Timers and Where to Find Them: High-resolution Microarchitectural Attacks in JavaScript,” in *Financial Cryptography and Data Security - 21st International Conference, FC*, vol. 10322, pp. 247–267, 2017.
- [143] G. J. Duck, X. Gao, and A. Roychoudhury, “Binary Rewriting Without Control Flow Recovery,” in *Proceedings of the 41st ACM SIGPLAN International Conference on Programming Language Design and Implementation, PLDI*, pp. 151–163, 2020.
- [144] S. Srikant, S. Liu, T. Mitrovska, S. Chang, Q. Fan, G. Zhang, and U. O’Reilly, “Generating Adversarial Computer Programs using Optimized Obfuscations,” in *9th International Conference on Learning Representations, ICLR 2021, Virtual Event, Austria, May 3-7, 2021*, OpenReview.net, 2021.
- [145] H. Ye, M. Martinez, X. Luo, T. Zhang, and M. Monperrus, “SelfAPR: Self-supervised Program Repair with Test Execution Diagnostics,” in *37th IEEE/ACM International Conference on Automated Software Engineering, ASE 2022, Rochester, MI, USA, October 10-14, 2022*, pp. 92:1–92:13, ACM, 2022.
- [146] W. Zhang, S. Guo, H. Zhang, Y. Sui, Y. Xue, and Y. Xu, “Challenging Machine Learning-based Clone Detectors via Semantic-preserving Code Transformations,” *IEEE Trans. Software Eng.*, vol. 49, no. 5, pp. 3052–3070, 2023.

**Part II**

**Included papers**



# WEBASSEMBLY      DIVERSIFICATION FOR MALWARE EVASION

---

**Javier Cabrera-Arteaga**, Tim Toady, Martin Monperrus, Benoit Baudry  
*Computers & Security, Volume 131, 2023*

<https://www.sciencedirect.com/science/article/pii/S0167404823002067>

# WASM-MUTATE: FAST AND EFFECTIVE BINARY DIVERSIFICATION FOR WEBASSEMBLY

---

**Javier Cabrera-Arteaga**, Nick Fitzgerald, Martin Monperrus, Benoit Baudry  
*Submitted to Computers & Security*

# CROW: CODE DIVERSIFICATION FOR WEBASSEMBLY

---

**Javier Cabrera-Arteaga**, Orestis Floros, Oscar Vera-Pérez, Benoit Baudry,  
Martin Monperrus

*Network and Distributed System Security Symposium (NDSS 2021), MADWeb*

<https://doi.org/10.14722/madweb.2021.23004>

# MULTI-VARIANT EXECUTION AT THE EDGE

---

**Javier Cabrera-Arteaga**, Pierre Laperdrix, Martin Monperrus, Benoit Baudry  
*Conference on Computer and Communications Security (CCS 2022), Moving  
Target Defense (MTD)*

<https://dl.acm.org/doi/abs/10.1145/3560828.3564007>



# SUPEROPTIMIZATION OF WEBASSEMBLY BYTECODE

---

**Javier Cabrera-Arteaga**, Shrinish Donde, Jian Gu, Orestis Floros, Lucas Satabin, Benoit Baudry, Martin Monperrus

*Conference Companion of the 4th International Conference on Art, Science, and Engineering of Programming (Programming 2021), MoreVMs*

<https://doi.org/10.1145/3397537.3397567>

# SCALABLE COMPARISON OF JAVASCRIPT V8 BYTECODE TRACES

---

**Javier Cabrera-Arteaga**, Martin Monperrus, Benoit Baudry

*11th ACM SIGPLAN International Workshop on Virtual Machines and  
Intermediate Languages (SPLASH 2019)*

<https://doi.org/10.1145/3358504.3361228>